

**US Environmental Protection Agency Report on USAID-Funded Hurricane Mitch
Activities in Central America
May 1999-March 2002**

EXECUTIVE SUMMARY

Background

In May 1999, the US Environmental Protection Agency (EPA) began work in Central America in response to the devastation from Hurricane Mitch which had caused severe damage to the region in October 1998. Based on visits to El Salvador, Nicaragua and Honduras and discussions with USAID Missions in each country, EPA submitted a proposal that would address the negative health effects from poor drinking water quality that were affecting the population. The method of achieving improvements in drinking water quality focused on improving the capacity of the institutions responsible for providing safe drinking water in targeted rural and key urban/periurban areas in El Salvador, Nicaragua and Honduras, particularly the water utilities and the ministries of health. This program became known as EPA's Safe Drinking Water Program in Central America. EPA was awarded \$2 million through an interagency agreement (IAA) that was signed in September 1999, almost five months after EPA had begun working in the region.

The four components of EPA's Hurricane Mitch activities were: 1) laboratory capacity building; 2) drinking water treatment plant optimization; 3) source water protection, and; 4) safe drinking water program development. The selection of these components was based on a variety of factors, including country priorities identified by government institutions with assistance from USAID Missions, EPA expertise in the US that matched said priorities, and the ability to identify regional or in-country partners who were willing to participate and provide sustainability after the completion of Hurricane Mitch activities.

Program Components

Strengthening of the laboratories was the most important element of EPA's program and the most recognized need in the countries in an effort to improve drinking water quality. None of the national governmental labs in Nicaragua, Honduras and El Salvador either at the water utilities, ministries of health or university labs were able to produce reliable and valid data on water quality. A series of assessment trips by EPA, revealed that equipment was outdated, technicians were not trained properly, lab space was often inadequate and there were no quality control procedures implemented. It was agreed that EPA, working with the Pan American Health Organization (PAHO), would train lab personnel, managers and technicians in both the methods and quality control issues required, in an effort to assist labs in moving toward accrediting their labs. In addition, some supplemental equipment was provided to the water utility labs and ministry of health labs. Although Honduras was not included in the original plan for this component, lab professionals in Honduras learned about the program through involvement in EPA's other programs and argued to be allowed to participate when funds permitted. No equipment was provided to the Honduras labs. This show of enthusiasm was encouraging to EPA and PAHO, and every effort was made to include the appropriate labs and staff in the training courses.

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The *optimization of drinking water treatment plants* component in El Salvador was part of a Salvadoran national plan that had been developed through a process involving representatives from the Salvadoran national institutions, US government agencies and international organizations such as PAHO and UNICEF prior to the hurricanes. The existence of this plan was a beneficial tool at a time when there were many needs in the country and allowed for a quick identification of needs and engagement by EPA in a timely fashion once USAID funds became available. In El Salvador there are seven drinking water treatment plants that supply large municipal populations, including the capital of San Salvador. The quality of the water coming out of the taps varies greatly throughout the year depending on whether it is the rainy or dry season, the quality of the distribution system, and the ability of the treatment plant to remove contaminants. In the US, EPA had developed a treatment plant evaluation tool that identifies performance limiting factors throughout the plant. Factors include not only infrastructure elements but staffing, management and safety issues. The effectiveness of the treatment plants was in question not only by EPA but by the water utility staff as well, and therefore deemed a crucial component to address in looking at overall water quality. This component was implemented by EPA and PAHO engineers through a train-the-trainer approach. An initial study tour and evaluation of a US treatment plant with the Salvadorans was the first step in the process followed by evaluations of four surface water treatment plants in El Salvador.

At a meeting in Nicaragua with the water utility, the president of the agency stated that *source water protection* (SWP) was a priority in the country. The reason for this, especially in light of the hurricanes, was that when parts of the country are inundated with heavy rainfall and flooding, rivers rise bringing a whole host of contaminants from agricultural areas, thus making it difficult to treat the water. Along with the sticks, rocks and sediment that can be seen with the naked eye, the more dangerous microbiological contamination from overflowing latrines, sewer systems and runoff can infiltrate the drinking water system easily. Often times these contaminants enter via the source, meaning wells or rivers, which are not adequately protected. The source water protection component was developed based on a US community-based approach and focused on the identification of contaminant sources and delineating “protection zones” that could be managed by the community. Also, with the decentralization of the water utilities in Nicaragua, a community- or municipal-based approach made the most sense. This program component was implemented through a series of demonstration projects in three communities located in the Hurricane Mitch-affected areas, which fed into the development of a Source Water Protection manual. Three final workshops provided the opportunity for water professionals from the communities and Managua to see the results of the pilot projects and learn about all of the elements of a SWP program.

The *development of safe drinking water programs* in Honduras was based on a need identified in part through discussions with the USAID/Honduras Mission. Through a network of water and sanitation professionals, known as the Grupo Colaborativo, of which the USAID water and sanitation program engineer is a member, EPA was able to determine that there was an overall lack of awareness among professionals and decision makers as to what the priorities for improving drinking water quality should be in the country. It was decided that a series of trainings would be developed to focus on the policy surrounding the creation of safe drinking

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water programs and the technical tools needed to make decisions. The three train-the-trainer courses developed and delivered to a large audience were: 1) Sanitary Survey Inspections; 2) Fundamentals of Safe Drinking Water, and; 3) Source Water Protection.

Funding

A total of \$2 million was awarded by USAID to EPA for Hurricane Mitch activities. In addition, \$900K of EPA appropriated funds was used over the two-year project to support those activities. A majority of the EPA funds were used to support the laboratory capacity building program. The breakdown by component for funding is as follows:

Laboratory capacity building:	\$600K
Treatment plant optimization:	\$200K
Source water protection:	\$400K
Safe DW program development:	\$800K

Additional EPA funds were used in the following manner:

Laboratory capacity building:	\$600K
Water quality monitoring and surveillance work:	\$250K
Evaluation of program:	\$50K

Key Findings and Recommendations

EPA conducted a final evaluation of the program to determine the effectiveness of the various components as well as of the overall program. EPA was also interested in lessons learned that could be applied to future programs as well as looking at the sustainability of the program and identifying elements needed to make it more sustainable. The final report for this evaluation will be available in May but already key findings and recommendations have surfaced that can be reported on.

The evaluation was based on quarterly reports and interviews with EPA team leaders, key PAHO program managers and in-country partners who were involved with the program. Forty-nine interviews were conducted both here in the US and in the region. Based on the evaluation, EPA has determined that the overall program has:

- Resulted in improvements in the reliability of analytical data produced by key water utilities, Ministries of Health, and university drinking water laboratories in El Salvador, Nicaragua, and, to a more limited extent, Honduras;
- Increased the capacity of these same entities to analyze samples for the pollutants of greatest concern, and to take steps toward accreditation of their laboratory facilities;

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- Resulted in a more constructive relationship between drinking water laboratories and those responsible for water treatment decisions;
- Resulted in improvements in the quality of drinking water produced by the water utilities;
- Helped the water utilities identify key factors limiting further improvements in ability to protect drinking water from microbial pathogens and has helped them develop strategic priorities;
- Helped to generate an enhanced network of water professionals in Honduras and Nicaragua. The workshops in particular allowed representatives from governmental agencies, municipalities, local and international NGOs, local businesses, and universities to share ideas and experiences, as well as establish relationships; and
- Improved coordination among drinking water officials in- and out-side of government

Overall, EPA and its key partners have worked together effectively toward the common goal of improving the safety of drinking water in Central America. At the outset of the project, EPA worked with AID to develop the key aspects of each drinking water effort. These agencies also identified key in-country partners to help them develop and implement the program. For example, EPA identified PAHO as a key resource to assist with identifying a network of water professionals to include in the workshops and pilot projects. PAHO also helped develop and deliver the workshops, and train in-country professionals to present the materials at future trainings. On the lab and treatment plant component, EPA also benefitted from its relationship with CEPIS - PAHO's technical group based in Lima, Peru - to support the laboratories in taking initial steps to achieve accreditation.

EPA also established strong partnerships with Grupo Colaborativo de Agua and SANAA in Honduras, and the Ministries of Health and the Environment in each of the three countries. The Grupo Colaborativo played a key role in gathering key decision-makers for the drinking water workshops, and SANAA became very active in the laboratory component as well as the institutionalization of sanitary surveys.

EPA identified numerous successes and challenges through the evaluation as well. They are as follows:

Successes

- The workshops and pilot projects enhanced participants' understanding of drinking water quality concepts and the relationship among drinking water protection, water quality, and public health;
- The program has planted the seeds for growth and sustainability regarding safe drinking water programs in Central America. For example, most of the laboratories have taken significant steps toward achieving accreditation, a key

determinant of sustainability, as a result of participation in the program. Moreover, organizations have begun to institutionalize aspects of EPA's trainings such as the sanitary surveys for water systems;

- The program has resulted in increased level of awareness among water officials, water utility managers, and the public in El Salvador, Honduras, and Nicaragua regarding the importance of water quality and the role of the water laboratories and treatment plants. This has, in part, helped the water utility laboratories garner more resources and suggests the possibility for increased support in the future. In addition, watershed management plans have begun to include source water and drinking water components;
- EPA's efforts have helped to generate an enhanced network of water professionals in Honduras, El Salvador, and Nicaragua. To a certain extent, the network also extends across these three countries and to other Central American countries. The workshops in particular allowed representatives from governmental agencies, municipalities, Nicaraguan and international NGOs, local businesses, and universities to share ideas and experiences, as well as establish relationships; and
- The program has resulted in improvements in the reliability of analytical data produced by key water utility, Ministry of Health, and university drinking water laboratories in El Salvador, Nicaragua, and, to a more limited extent, Honduras.

Challenges Remaining

- There is a lack of a strong drinking water regulatory framework in each country that inhibits institutionalization of this program's technical and policy components into water laws;
- The workshops/pilot projects have not yet resulted in broad-scale, long-term adoption of safe drinking water tools and approaches by country agencies and institutions;
- Technical capabilities of in-country water professionals are still lacking in certain areas (e.g., developing source water protection plans), which threatens the sustainability of these programs over the long-term;
- Although trust has been established between the ministries of health and the water utility at a technical level, similar trust was not established between the organizations at a policy, or senior management level;

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- Improvements in the reliability of analytical data produced by key water laboratories in El Salvador and Nicaragua were limited by the lack of resources needed to develop quality control manuals, the sequencing of training and receipt of laboratory equipment, and inadequate staffing, equipment, and supplies within most laboratories;
- To attain support from the public in these programs, additional outreach is necessary to helping communities become both knowledgeable and concerned about drinking water quality. Moreover, there has to be an effort to affect change in certain day-to-day activities as a result of concern for public health (e.g., where possible, individuals not washing clothes in water bodies used for drinking water);

Continued follow up from EPA, USAID or regional experts is needed to continue the momentum and interest that has developed over the past two years.

Conclusions

Prior to EPA's Hurricane Mitch activities in Central America, protecting drinking water quality was not a priority for the national governments. This resulted in neglect of the drinking water laboratories, treatment plants and personnel who work there. Throughout the EPA program, enthusiasm and interest peaked. In many interviews during the evaluation, participants expressed a new excitement for their work that was a result of the activities in which they had participated. Many had never received training when they began working at the labs or in the treatment plants. They would learn on-the-job and oftentimes had little or no formal education in their field. This is, unfortunately, a common occurrence in the developing world and Central America is no exception.

It is important to remember that although there were many successes, follow-up is needed in order to ensure sustainability. One important factor that is lacking is the institutional support that would provide funding needed for additional training, equipment and development of programs that address drinking water quality. USAID, as a permanent presence in the countries, can serve a role in this effort but additional technical assistance is needed from EPA, PAHO and other key groups that have contributed to the overall efforts. Clearly, with a strong foundation that now exists in the region to address water quality issues, minimal funds would be needed to provide the additional assistance. This opportunity should not be overlooked because it is in the best interest of the US government to make sure that its large investment in the region will not be for naught.